or smaller semiconductor devices. Improved or smaller semiconductor devices may be accomplished by reducing leakage and increasing the dielectric constant."

In the Claims

1. (Amended) A method of forming a dielectric layer on a semiconductor device comprising:

providing a substrate having at least one semiconductor layer;

forming a first conductive layer over at least a portion of the substrate;

depositing a silicon-containing material from a silicon source on the first conductive layer;

forming the dielectric layer by processing the deposited silicon-containing material with a reactive agent selected to react with silicon atoms of the deposited silicon-containing material; and

forming a second conductive layer over the dielectric layer.

5. (Amended) The method of claim 1, wherein the reactive agent is selected from the group comprising $NH_3$, $N_2$, $O_2$, $O_3$, $N_2O$ and NO.

12. (Amended) A method of forming a dielectric layer comprising:

providing a substrate having at least one semiconductor layer;

vapor depositing a silicon-containing material from a self limiting silicon source on at least a portion of the substrate, wherein said portion of said substrate is conductive; and

forming the dielectric layer by processing the silicon-containing material in a reactive ambient at a processing temperature, a processing time and a processing pressure selected to result in a desired dielectric constant and leakage characteristics.

26. (Amended) A method of forming a dielectric layer comprising:

providing a substrate having at least one semiconductor layer;